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(54) Bottle with screw cap and  
tamper-proof seal

(57) A bottle 1 having a screw cap is provided with a tamperproof seal which is destroyed when the bottle is first opened. The bottle has ratchet-like abutments 8 which can be over-ridden by resilient tongues on the cap, when the cap is being screwed onto the bottle. When the cap is rotated relative to the bottle for unscrewing the cap, the tongues engage with the abutments and cause a sealing ring, on which the tongues are provided, to break away from the cap.

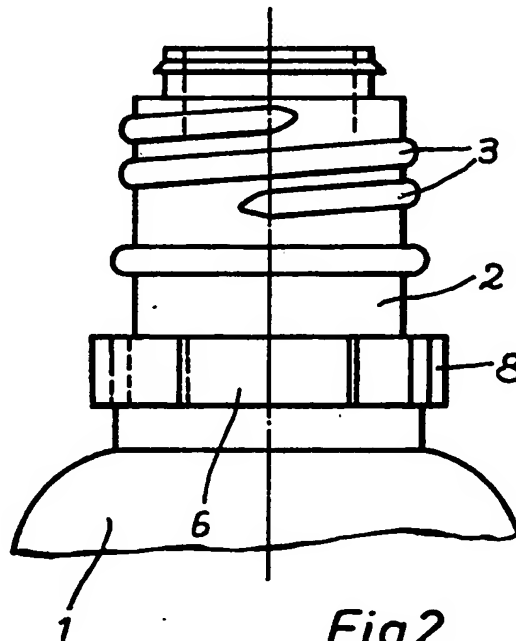
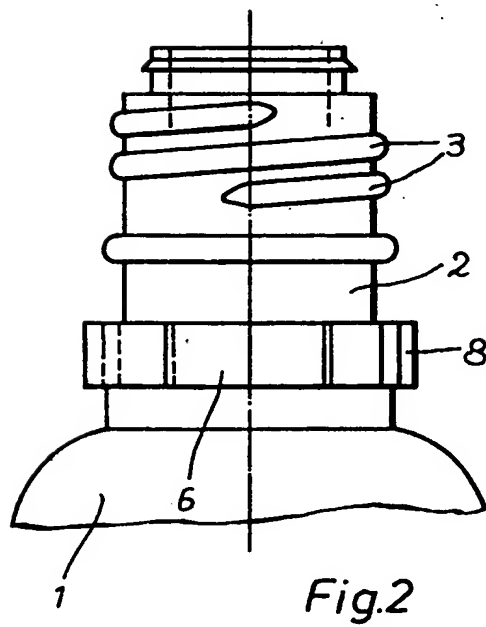
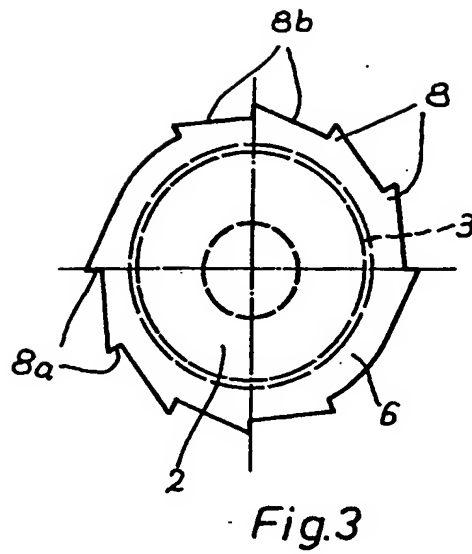
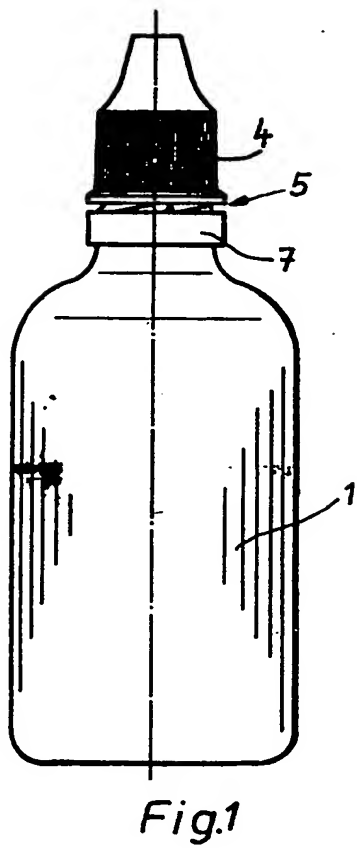
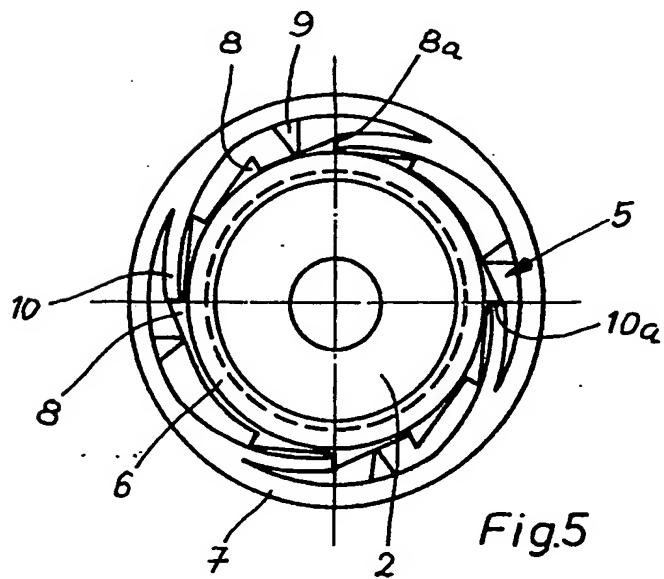
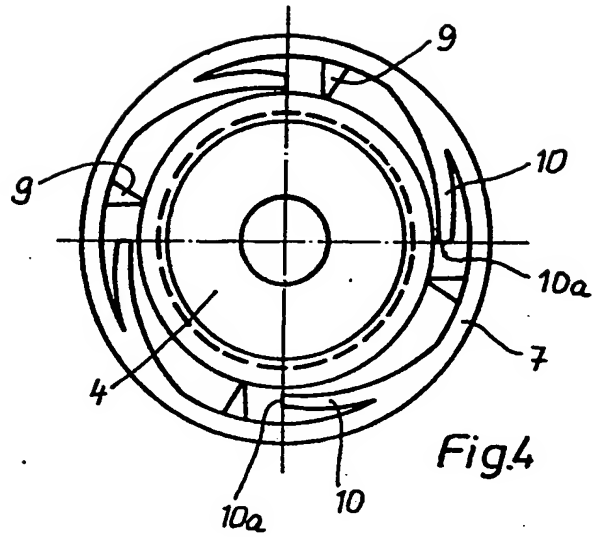


Fig.2



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## SPECIFICATION

## Bottle with screw cap and tamperproof seal

- 5 The invention relates to a bottle with a screw cap fitted with a tamperproof seal which is destroyed when the bottle is first opened.

- For metallic caps, a tamperproof seal may be achieved by means of a flange rim which is connected to the cap by perforations and which is separated by means of the perforations when the cap is opened. A considerable expenditure of force is however required, to separate the cap from the flange rim, which is disadvantageous. Frequently this separation is not achieved, and the cap has to be forced and unscrewed from the neck of the bottle together with the flange rim, which is very difficult. Consequently these seals do not display the desired effect in use.

- 20 Tamperproof seals on plastics caps have also become familiar, in which a locking ring also has to be separated during unscrewing, which produces the same difficulties regarding slipping round and inadequate separation.

- 25 The object of the present invention is therefore to provide a bottle with a screw cap, having a simply designed, cheaply produced, reliably operating and easily destroyed tamperproof seal which can be operated with a small expenditure of force.

- This object is achieved according to the invention in that a separable sealing ring with internal tongues is moulded to the screw cap by means of small connecting bridges which produce points of weakness, and in that a separating collar having abutment projections and covered by the sealing ring when the cap is in its sealing position, is mounted on the neck of the bottle, at least one separating collar projection locking against a tongue during the opening motion of the screw cap to cause separation of the sealing ring from the screw cap.

- 45 In a preferred embodiment, the separating collar is designed like a ratchet wheel and is moulded to the neck of the bottle, the bottle thus being made of plastics in one piece. The screw cap with sealing ring also forms a plastics part produced as one piece.

Advantageous optional features are set out in other sub-claims appended hereto.

- The plastics bottle with screw cap according to the invention is fitted with a tamperproof seal which has a simple design, permits cheap production, has reliable operation and easy, energy-saving operation for its destruction.

- The two seal sections on the bottle and on the cap combine satisfactorily in the sealed position as a tamperproof guarantee and can hardly be seen by eye. When the cap is turned in the direction of opening by hand, they permit a reliable separation from each other, because for this purpose there are provided favourably combining locking means

which prevent forcing or too great an expenditure of force, but automatically bring about the breaking of the tamperproof seal on opening.

- 70 An embodiment in accordance with the invention is hereinafter particularly described with reference to the accompanying drawings, wherein:—

*Figure 1* is an elevation of a bottle with a screw cap and tamperproof seal;

*Figure 2* is an elevation of a part of the bottle with a separating collar moulded to the neck of the bottle as part of the tamperproof seal;

80 *Figure 3* is an underplan view of the separating collar with abutting projections;

*Figure 4* is an underplan view of the screw cap with moulded-on sealing ring as a counterpart to the separating collar;

85 *Figure 5* is a plan view of the tamperproof seal with separating collar and sealing ring working together in the sealed position.

Reference numeral 1 designates a bottle, in particular a plastics bottle, onto the moulded bottle neck of which 2 with external thread 3 there is threaded a screw cap 4 which can be undone. Associated with the bottle 1 and the screw cap 4 is a tamperproof seal 5 which consists of two coacting part 6, 7 one of which (6) is mounted on the bottle 1 and the other (7) on the screw cap 4.

Part 6 is made up of a moulded separating collar on the neck of the bottle 2, near the transition region between neck 2 and bottle 1, which extends annularly round the bottle neck 2 and is provided with abutment projections 8 pointing outwards.

These abutment projections 8 are designed like teeth and from a locking shoulder 8a which becomes effective against the opening rotational motion (left-handed) of the screw cap 4. To this locking shoulder 8a, there runs from each toothlike abutment projection 8 a tangential sliding surface 8b which is formed in a straight line or an arc. This separating collar 6 with its projections 8, has the shape of a ratchet wheel.

The abutment projections 8 can be arranged on the entire circumference of the separating collar 6 with equal mutual spacing, or can be provided in two or more groups, so that a greater gap is provided between each group made up of three, four or five projections than the gap between the individual projections 8.

On the lower end of the screw cap 4 a sealing ring 7 is fitted as a counterpart to the separating collar 6, the ring being connected to the screw cap 4 during manufacture by means of small connecting bridges 9 which form points of weakness. By means of these small connecting bridges 9, the sealing ring 7 is carried along when the screw cap 4 is screwed onto the neck of the bottle 2, but when the cap 4 is unscrewed, separation of

the cap 4 from the sealing ring 7 is automatically brought about by coaction of the separating collar with the sealing ring. The small bridges 9, which provide a small area connection with the screw cap 4, are torn off from the cap 4.

The annular sealing ring 7 has internally projecting tongues 10 which are inherently resilient and are directed tangentially inwards.

- 10 The tongues 10 are moulded to the inside of the ring 7 at one end and at their other have a form locking edge 10a coacting with the projections 8, since these tongues 10 are overridden and forced outwards by the projections 8 when the cap 4 is screwed on and, when the cap is unscrewed about against the locking edges 8a of the projections and are consequently locked against turning, so that an automatic separation of the ring 7 from the cap 4 takes place in the region of the small connecting bridges 9. These tongues 10 run in the unscrewing direction of the cap 4 and their free front end with locking edge 10a opposes the direction of unscrewing; the tongues extend in the longitudinal direction in a straight line or an arc.

The screw cap 4 is made in one piece in plastics material together with the moulded-on sealing ring 7, and the separating collar 6 is also produced as one piece with the plastics bottle.

For example, the sealing ring 7 has four tongues 10 arranged evenly spaced on its periphery, and in each case there is provided between neighbouring tongues 10 a small connecting bridge which presents a triangular basic shape in plan view and is connected to cap 4 at its apex.

The screw cap 4 with sealing ring 7 is screwed on to the bottle neck 2, in the course of which operation the tooth sliding surfaces 8b of the separating collar projections 8 constantly push back outwardly the tongues 10, so that the tongues 10 override the projections 8. In the fully screwed-on position of the cap 4, the tongues 10 lie with their locking edge 10a between the projections 8, or partially on the projections 8; the ring 7 encloses the collar 6.

50 If now the contents of the bottle are to be used, the cap 4 is unscrewed. In doing so the sealing ring 7 is carried along with the cap 4 until at least one tongue 10 comes up against a projection 8 by its locking edge 10a. The stationary separating collar projection 8 now prevents further movement of the sealing ring 7 during the unscrewing of the cap 4, and separation of the sealing ring 7 from the cap 4 is achieved by means of the abutting locking parts 8, 10. The cap can be fully unscrewed from the neck 2, and the sealing ring 7 remains on the bottle neck 2 because it lies round the separating collar 6.

The tamperproof seal 5 is destroyed when the cap 4 is unscrewed for the first time.

## CLAIMS

1. A bottle, with a screw cap which is fitted with a tamperproof seal which is destroyed when the bottle is first opened, characterised in that a separable sealing ring with internal tongues is provided on the screw cap by means of small connecting bridges which produce points of weakness, and that a separating collar having abutment projections and overlaid by the sealing ring when the cap is in its sealing position, is mounted on the neck of the bottle, at least one separating collar projection locking against a tongue during the opening motion of the screw cap and covering the separation of the sealing ring from the screw cap.
2. A bottle, according to claim 1, wherein the separating collar located near a transition region between the neck and the bottle annularly round the bottle neck is moulded to the plastics bottle.
3. A bottle, according to either of claims 1 and 2, wherein that the separating collar with its abutment projections is shaped like a ratchet wheel.
4. A bottle, according to any one of claims 1 to 3, wherein the abutment projections of the separating collar have a sliding surface pointing tangentially outwards in the direction of unscrewing and running in a straight line or in an arc in the longitudinal direction, and an adjoining radial or tangential locking edge projecting outwards.
5. A bottle, according to any one of claims 1 to 4, wherein the abutment projections on the periphery of the separating collar are arranged evenly spaced.
6. A bottle, according to any one of claims 1 to 4, wherein the abutment projections are arranged on the periphery of the separating collar in two or more groups of several projections.
7. A bottle, according to any one of claims 1 to 6, wherein there are provided on the inside of the annular sealing ring a plurality of tongues evenly spaced on the periphery, between which is located a small connecting bridge.
8. A bottle, according to any one of claims 1 to 7, wherein the tongues are moulded to the ring at one longer end and run straight and/or in an arc in the longitudinal direction and point tangentially inwards in the cap screwing-on direction, and form a locking edge at their free front end disposed to oppose the screwing-off of the cap.
9. A bottle, according to any one of claims 1 to 8, wherein the small connecting bridges have a triangular shape with their apex connected to the front of the cap.
10. A bottle, according to any one of claims 1 to 9, wherein the separating collar and the sealing ring which overlaps the former have approximately the same height.

11. A bottle, according to any one of claims 1 to 10, wherein the screw cap with moulded on sealing ring is made of plastics.

12. A bottle substantially as described  
5 herein with reference to the accompanying drawings.

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